



## **Some new taxa of *Potentilla* (Rosaceae) from New Guinea, Asia and Canada (Notes on *Potentilla* XV.)**

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JIŘÍ SOJÁK

## Some new taxa of *Potentilla* (*Rosaceae*) from New Guinea, Asia and Canada (Notes on *Potentilla* XV.)

### Abstract

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Four species, seven nothospecies and seven varieties of *Potentilla* are described as new to science and some of them are illustrated. *P. bidentula* (without any close relationship), *P. pycnophylla* (closely related to *P. papuana*), one nothospecies (*P. xpantotricha*) and three new varieties are described from New Guinea. One new variety is described from Sumatra, one from Sulawesi. *P. spectabilis* (of the *P. fruticosa* complex) is a new species from SE Tibet (Xizang). A new variety of *P. peduncularis* is described from Nepal, one nothospecies (*P. xaurantiaca*) from Kashmir. *P. hubsugulica* (related to *P. evestita*) is described from N Mongolia, three nothospecies (*P. xala-arcaea*, *P. xbishkekensis* and *P. xsolitaria*) and one variety are described from the former Soviet Central Asia. One hybrid, previously found in the Russian Far East and E Mongolia, has been obtained now by experimental crossing and is described as *P. xrecensita*. From Canada the hybrid of *P. hyparctica* × *P. litoralis* is described as *P. xtundricola*.

### *Potentilla bidentula* Soják, sp. nova

Holotype: New Guinea / Irian Jaya, foot of Mt Doorman, swampy open ravine, 1920, Lam 1764 (L) – Fig. 1 A-B.

Species unica *Potentillae* sect. *Pentaphylloides* (= *Anserinae*) caudiculis elongatis et simul foliolis lateralibus omnibus 2(-3)-fidis subtus cano-sericeis conspicua.

*Rosula primaria* ex axillis foliorum externorum caudiculos 1-3 emittens; *caudiculi* prostrati, elongati (ad 20 cm), c. 1-2 mm crassi, denique lignescentes, appresse pilosi, stipulis emortuis partim tecti (internodia caudiculorum inferne 0.5-2 cm longa), foliis pinnatis a sese remotis praediti; caudiculi postremo rosulis foliorum terminati. *Caules* floriferi 4-8 cm longi, uniflori, e basi arcuata erecti vel ascendentes, pilis appressis vel oblique arrectis vestiti; folia caulina ± 2, parva, folium inferius 3-6-jugum, superius ± simplex, stipulae eorum integerrimae, modice magnae, extra dense pilosae. *Folia* basalia 10-19-jugo-pinnata, 3.5-10 cm longa. *Stipulae* appresse pilosae; auriculae connatae. *Petioles rhachesque* pilis appressis, rectis, mollibus, 1-3.5 mm longis tectae. *Foliola* rigidula, terminalia 3-dentata, lateralia bidentata (tridentatis admixtis), summa lateralia basi lata breviter (± 0.5 mm) decurrentia, cetera sessilia, 4-6 × 4-5 mm magna, perdensa (2-3 mm a

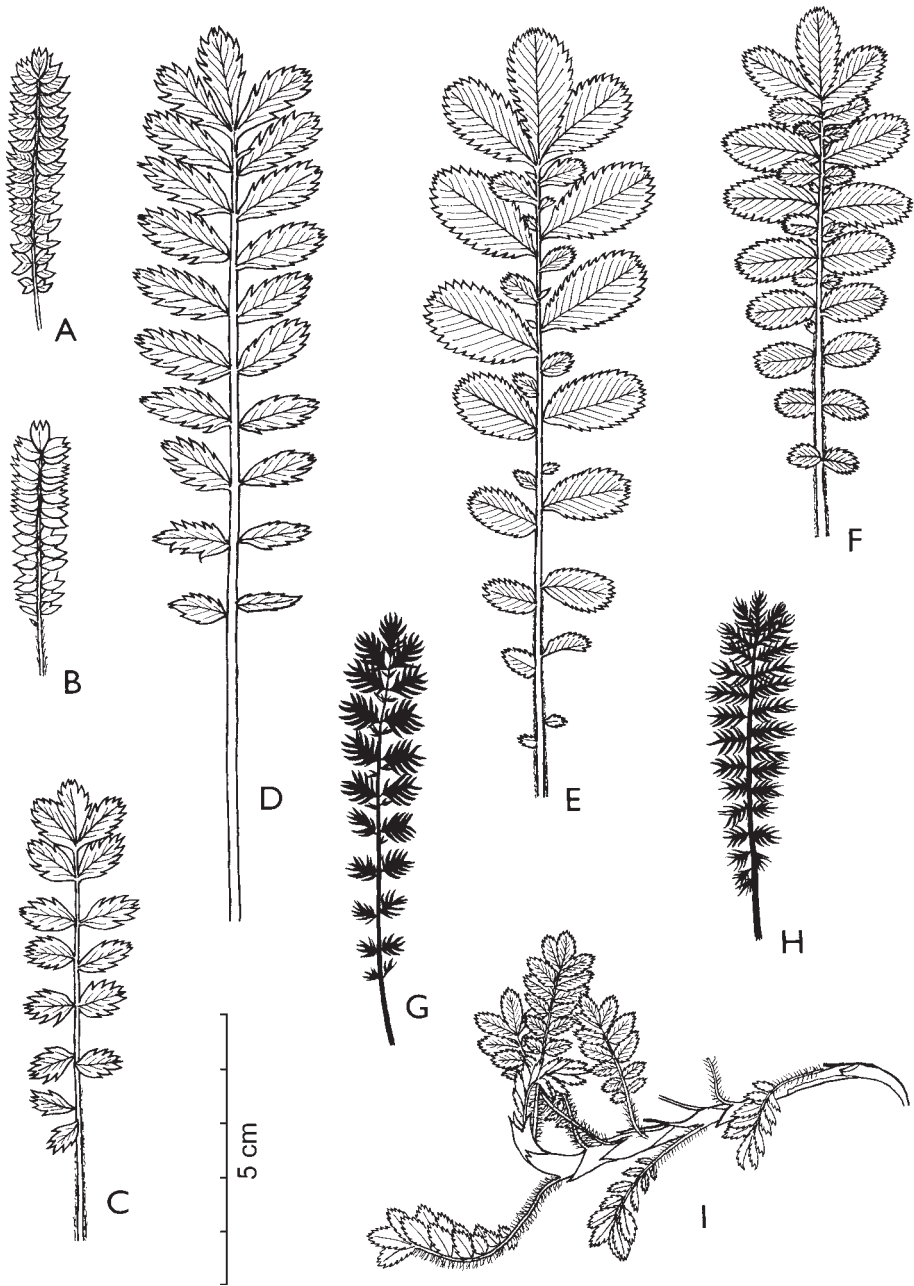


Fig. 1. Basal leaves – A-B: *Potentilla bidentula*; C-D: *P. papuana*; E-F: *P. pycnophylla*; G: *P. papuana* var. *victorialis*; H: *P. sumatrana* var. *achillea*. – I: Stolon (i.e. branch of the caudex) of *P. hooglandii* var. *rufa*. – A-B, E-I from the type collections; C-D from van Royen 16421.

sese distantia), supra ad margines pilosa, subtus cano-sericea, opaca vel submicantia, superficie tota pilis tenuissimis, densissimis, appressis, rectis (partim subflexuosis), modice longis (0.4-1 mm, ad costam 1-2 mm) vestita. *Calyx* ± appresse pilosus. *Episepala* oblonga, sepalis subbreviora. *Petala* ignota. *Stamina* 20; antherae 0.4-0.5 mm longae. *Stylus* lateralis, 0.9 mm longus. *Nuculae* ignotae.

*Potentilla bidentula* is the only species of *P.* sect. *Pentaphylloides* Tausch (= *P.* sect. *Anserina* Gaudin) producing stolons and having, at the same time, leaflets densely sericeous below, with 2(-3) teeth. *P. wilhelminensis* P. Royen and *P. adinophylla* Merr. & Perry, having numerous congested, densely sericeous leaflets similar as in *P. bidentula*, produce no stolons and their leaflets have 4-6 pairs of teeth.

***Potentilla pycnophylla* Soják, sp. nova**

Holotype: Papua New Guinea, Huon Pen., Morobe Distr., Monarauwe, Salawaket Range, 1964, *Hoogland* 9727 (CANB) – Fig. 1 E-F.

*Potentilla papuana* similis est, sed foliolis utrinque 5-8(-9)-dentatis, staminibus 15-18(-20) et foliis pinnatis vel in parte superiore simpliciter interrupte pinnatis (non dupliciter interruptis) a specie nostra sufficienter dignoscitur.

*Caules* (4-)15-30(-50) cm alti, 1-10(-20)-flori, recti vel flexuosi, 1-2 cm crassi, 2-5(-8)-phylli, inflorescentia terminati, ± albo-tomentosi. *Folia* basalia (4-)10-25 cm longa, in parte superiore dupliciter interrupte pinnata (rarissime simpliciter interrupta jugis foliolorum interpositis in toto 3-5), vulgo jugis primi ordinis omnino 6-11 et jugis interpositis omnino 4-6(-10) praedita. *Stipulae* pilis appressis, tenuissimis, ± 2-4 mm longis. *Rhaches* pilis tenuissimis, appressis, densis, 1-4 mm longis sericeae (interdum insuper pili breves flexuosi evolutae). *Foliola* ambitu elliptica, ad 1/4-1/3 dimidiam laminae crenata; foliolium terminale crenis utrinque 10-15, foliola lateralia crenis utrinque 8-16 praedita; foliola supra plerumque cana, subtus dense argenteo-sericea, pilis extreme tenuibus, rectis, longis (interdum inter nervos praeterea pilis brevibus, flexuosis) vestita. *Flores* 1.2-1.5 cm in diam.; pedicelli crassi. *Hyanthium* et *calyx* appresse albo-sericei. *Receptaculum* sub fructu accrescens; calyx sub fructu 1.2-1.6 cm in diam. *Episepala* sepalis aequimagna, lanceolata, elliptica vel rhomboidea, saltem nonnulla dentata. *Petala* 5-7 mm longa. *Stamina* 20-22(-25); antherae 0.3-0.6 mm longae. *Stylus* lateralis, 0.5-0.7 mm longus. *Nuculae* leves, 0.9-1.5 mm longae.

*Additional specimens examined.* – PAPUA NEW GUINEA: Centr. D., Mt Awormange, E of Woitape, 9300', 1965, *van Royen NGF 20373* (CANB); Neon Basin, 15 km NNE of Woitape, 1974, *Croft & al. LAE 61519* (CANB); *ibid.*, Wharton Ra., 2880 m, 1979, *Weatherstone ANU 16497* (CANB); W slope of Wharton Range, Samarai - Avios, 1965, *van Royen NGF 20433* (CANB); Tapini Subd., Mt Strong 11500', 1971, *Coode & Stevens NGF 46197* (CANB); *ibid.*, Mt Scratchley, Helicopter pad, 11400', 1971, *Stevens & Coode LAE 51465* (CANB); Morobe D., Mt Salawaket, 1963, *Hartley TGH 11128* (CANB); Salawaket Range, Tempaupan, 11000', 1964, *Hoogland 9836* (A, CANB); Huon Pen., Cromwell Mts, Mannasat, 7500', 1964, *Hoogland 9470* (CANB); Mt Victoria, 3600 m, 1974, *Craven 3029* (CANB); *ibid.*, 3900 m, 1974, *Croft & al. LAE 61791* (CANB); *ibid.*, Isuani grassland, 2700 m, 1974, *Croft & al. LAE 61656* (CANB); *ibid.*, 2800 m, 1974, *Craven 2854* (CANB); *ibid.*, 1976, *van Royen 10871* (CANB); Albert Edward, 1969, *Foreman & Wardle NGF 45598* (CANB); Kokoda Subd., Mt Kenive (Nisbet), 2400 m, 1974, *Croft LAE 65161* (CANB); *ibid.*, 3000 m, 1974, *Croft & al. LAE 65117* (CANB); Kokoda Subd., Mambare River, 8700', 1969, *Pajmans 812* (CANB).

Initially I intended to describe this taxon as a variety of *Potentilla papuana* Focke. The extensive herbarium material obtained on loan from CANB, however, indicated that this is a well defined species. The deviating number of teeth of the leaflets is correlated with a definite leaf shape (i.e. number of smaller interposed leaflets) and the number of stamens. The distribution of both species is also different.

*P. pycnophylla* has leaves doubly interruptedly pinnate with 4-6(-10) pairs of interposed leaflets of the second and third order, terminal leaflet with 10-15 pairs of teeth and flowers with 20-22(-25) stamens. Leaves of *P. papuana* are pinnate or interruptedly pinnate with 1-3 pairs of interposed leaflets. The terminal leaflet has 5-9 pairs of teeth, the flowers have 15-18(-20) stamens (lectotype of *P. papuana* selected here: K, isotypes MEL).

***Potentilla xpantotricha* Soják, nothosp. nova**

= *Potentilla gorokana* Kalkman × *P. philippinensis* Merr. (*P. foersteriana* sensu Kalkman)

Holotype: Papua New Guinea, Wabag Subd., N slopes of Sugarloaf complex (Wapu river), 1960, Hoogland & Schodde 7021c (CANB).

Habitu et indumento inter parentes media. *Potentilla gorokana* foliolis subtus dense vestitis, i.e. argenteo- vel albo-sericeis (superficies folioli infra indumentum sub lente non visibilis) et *P. philippinensis* (*P. foersteriana* sensu Kalkman) foliolis subtus inter nervos laterales glabris a nothospecie nostra sufficienter distant.

*Caules* 2-9 cm alti, 1-2-flori, foliis 1-2 pinnatis instructi. *Folia* basalia (12-)14-16-jugo-pinnata. *Rhaches* pilis (1.5)-2-2.5 mm longis tectae. *Foliola* subtus omnino, i.e. in nervis et inter nervos regulariter pilosa, pilis tenuissimis, appressis, modice numerosis (superficies folioli inter indumentum sub lente bene visibilis); foliola terminalia dentibus utrinque (2-)3-6, ad 1/3-1/2 dimidiam laminae attingentibus. *Hypanthium* pilis tenuibus, appressis, dense vestitum.

*Additional specimens examined.* – PAPUA NEW GUINEA: Laiagam Subd., Yobobos (Lagaip river), 1960, Hoogland & Schodde 7480 (A, CANB); Wabag Subd., N slopes of Sugarloaf complex, 1960, Hoogland & Schodde 7021b (CANB); Chimbu, Mt Wilhelm, Pindaunde, 1968, Reeve 829 (CANB).

In *Potentilla gorokana* Kalkman the underside of leaflets is all silvery-sericeous, covered by dense, straight hairs, whereas in *P. philippinensis* Merr. (*P. foersteriana* sensu Kalkman) only the midrib and teeth surface are hairy but otherwise the leaflets are glabrous or hairy only on the veins. The new nothospecies refers to the intermediate individuals that are found sometimes in areas where both species are present. In those plants the entire underside of the leaflets is rather sparsely covered by hairs, so that the green surface of the leaflet can still be seen under a lense.

***Potentilla hooglandii* var. *rufa* Soják, var. nova**

Holotype: New Guinea / Irian Jaya, Carstensz Mts, Carstensz meadow, 1971, Hope ANU 10878 (CANB) – Fig. 1 I.

Habitu *Potentillam bidentulam* remote admonet, a qua foliolis omnibus utrinque 5-7-dentatis, caulibus floriferis et rhachidibus foliorum patenter pilosis etc. bene distinguitur. *P. hooglandii* var. *hooglandii* a varietate nostra internodiis caulinarum longis, patenter pilosis, stipulis caulinis dilutis, auriculis earum omnino dense pilosis et foliis rosularum nonnullis interrupte pinnatis sufficienter diversa.

*Caudiculi* (caules decumbentes) appresse pilosi, internodia eorum brevia, saepe stipulis emortuis tecta. *Caules* floriferi 2-4 cm alti, 1-flori, 2-phylli, patenter pilosi; folia caulina pinnata; stipulae rufae, auriculae earum connatae, solum ad nervos et margines pilosae, ceterum glabrae. *Folia* rosularum 7-10-jugo-pinnata. *Rhaches* pilis 1-2 mm longis, patentibus tectae. *Foliola* utrinque 5-7-dentata, supra appresse argenteo-pilosa, subtus argenteo-sericea.

*Additional specimens examined.* – NEW GUINEA / IRIAN JAYA: W Sepik, Dagabulon, 3400 m, 1975, Veldkamp 6607 (CANB). — PAPUA NEW GUINEA: Morobe Distr., Salawaket, 1937, Clemens 5263 (UC).

*Potentilla hooglandii* Kalkman is a homogenous species showing little variation. The extensive material obtained on loan from CANB contained two herbarium sheets, differing from usual *P.*

*hooglandii* by stolons with appressed-hairy internodes, covered by dark rusty stipules hairy only on the veins and in the margins. This deviation seems to indicate a characteristic variety.

***Potentilla brassii* var. *giluwensis* Soják, var. nova**

Holotype: Papua New Guinea, Mt Giluwe, 1/4 mile SW of 1 peak, forms hard, herbaceous quite flat hummocks, 1967, *Wade & McVean ANU 7792* (CANB) [two sheets] – Fig. 2 C-D.

A *Potentilla brassii* var. *brassii* differt foliis (1-)3-4-jugo-pinnatis (non 4-8-jugo-pinnatis) et foliolis subtus omnino glabris, antice latissimis.

*Caules* tantum 1.5-3 mm longi, 1-2 stipulis connatis instructi. *Folia* basalia (1-)3-4-jugo-pinnata, 0.4-1 cm longa, emortua longe persistentia. *Foliola* utrinque glabra, lateralia ad basin bisecta, segmentis majoribus oblongo-linearibus vel lineari-oblongeolatis, supra medium latissimis, 2-3 × 0.5-0.8 mm magnis.

The new variety of *Potentilla brassii* Merr. & Perry is so far known only from one mountain range. All 15 individuals collected are uniform. Therefore they can be treated as a good variety, which may even prove to be a separate species. To determine the taxonomic value, additional collections or field observations are needed.

***Potentilla papuana* var. *victoralis* Soják, var. nova**

Holotype: Papua New Guinea, Centr. Subd., Mt Victoria, southern peak of massif, short grassland, 3550 m, 1974, *Craven 3027* (CANB; isotype: A) – Fig. 1 G.

Haec varietas *Potentillae papuanae* var. *papuanae* similis, a qua foliolis pinnatisectis (ad 2/3-4/5 dimid. laminae divisio), supra disperse pilosis, episepalis angustis, integerrimis, apice et marginibus pilis crassiusculis, rigidis tectis, calyce in fructu non dilatato differt. *P. sumatrana* var. *achillea*, quae habitu plantae nostrae simillima, stipulis emortuis longe lanatis, folio caulino uno, ± reducto, non pinnato, stipulis angustis instructo, stylo 1.4-1.6 mm longo, hypanthio pilis crassis, rigidis tecto etc. distat.

*Caules* 6-15 cm alti, folia basalia superantes, 1-3-flori, ± 2-foliati (folia caulina pinnata; stipulae latae, laciniatae). *Folia* basalia 9-20-jugo-pinnata, interdum interrupta, 5-10 cm longa. *Rhaches* pilis appressis, 1-2 mm longis, mediocriter tenuibus tectae. *Foliola* ± elliptica, omnia sessilia, lateralia superiora segmentis utrinque 3-5 linearibus, c. 2-3 × 0.7-1 mm magnis, ad 2/3-4/5 dimid. laminae attingentibus, supra viridia, pilis dispersis tecta, subtus pilis rectis argenteo-sericea. *Flores* longe ± tenuiter pedicellati. *Calyx* in fructu non dilatatus. *Hypanthium* tenuiter ± breviter appresse pilosum. *Sepala* episepalaque inferne pilis tenuibus, superne crassiusculis rigidulis subsericea; episepala oblonga, integerrima, sepalis ± aequilonga. *Petala* ignota. *Stamina* (18-)20; antherae ± 0.5 mm longae. *Stylus* lateralis, 0.9-1 mm longus. *Nuculae* ± 1.4 mm longae.

*Additional specimens examined.* – PAPUA NEW GUINEA: Summit of Mt Victoria, 3900 m, 1974, *Croft & al. LAE 61792* (CANB); Mt Victoria area, from Koma Creek to the Rock Pile, SE of Mt Service, 3750 m, 1976, *van Royen 10931* (CANB).

*Potentilla papuana* Focke var. *victoralis* differs from the type variety in the pinnatisect leaflets dispersedly hairy above, thin stalks, hypanthium not widened in fruit and narrow entire episepals with fine and stiff thick hairs as on the sepals.

The leaves of *P. papuana* var. *victoralis* resemble those of *P. sumatrana* Soják var. *achillea*. This similarity is, however, only accidental, because the first belongs to the relationship of *P. papuana* var. *papuana* and the latter to the *P. peduncularis* D. Don aggregate, as indicated by the reduced cauline leaves, long styles and other characters.

***Potentilla papuana* var. *celebica* Soják, var. nova**

Holotype: Indonesia, Sulawesi, G. Bonthain, 1921, *Bunne Meyer 12251* (L).

A *Potentilla papuana* var. *papuana* staminibus minus numerosis differt.

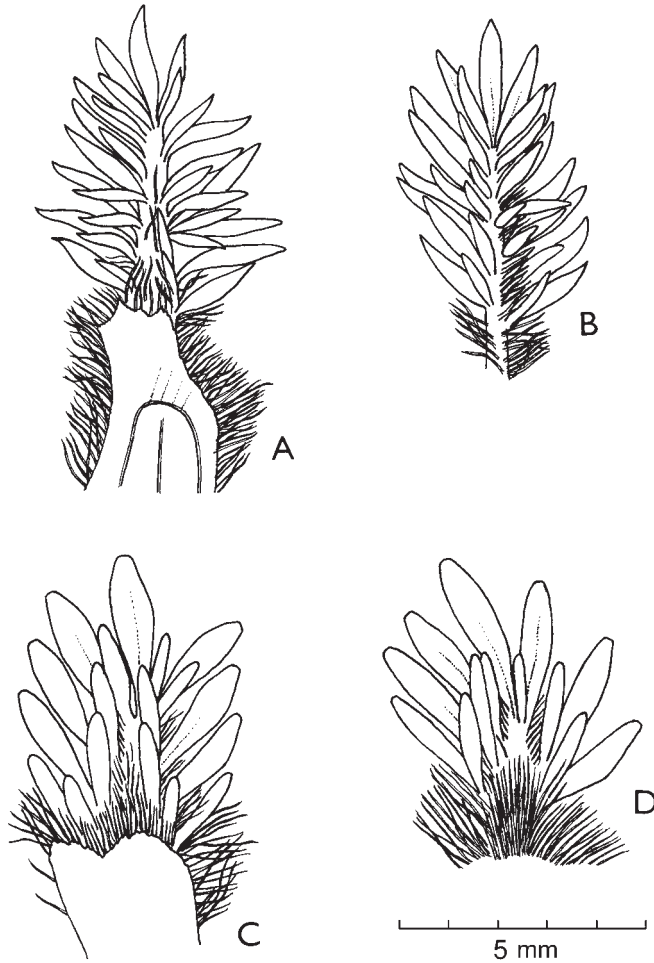


Fig. 2. Basal leaves – A-B: *Potentilla brassii* var. *brassii*; C-D: *P. brassii* var. *giluwensis*. – A-B from *Brass 10156*; C-D from *Wade & McVean ANU 7792*.

*Stamina* (9-)10-11(-12). *Stylus*  $\pm 0.7$  mm longus. *Notis aliis cum varietate typica congruit.*

*Additional specimens examined.* – SULAWESI: Rante Mario, 1937, *van Steenis 714* (L); Latimjong Range, 1981, *J. M. B. Smith 629* (L); G. Bonthain, 1921, *Bunnemeyer 11895* (L); Bonthain, Bawa Kraeng, 1937, *Froideville 210* (L).

Flowers of *Potentilla papuana* from New Guinea and Luzon have uniformly 15-18(-20) stamens. The plants from Sulawesi with 9-12 stamens, appear worth to be treated as a separate variety.

***Potentilla sumatrana* var. *achillea* Soják, var. nova**

Holotype: Indonesia, Sumatra, Gaju and Alas Lands, Mt Losir, 1937, *van Steenis 8666* (L) – Fig. 1H.

A *P. sumatrana* var. *sumatrana* foliolis fere ad costam pinnatisectis dignoscitur.

*Caules* 2-3-flori, 3-13 cm alti; folium caulinum 1, simplex (vel ternatum), stipulae eius serratae. *Folia* (8-)10-18-jugo-pinnata, 3-9 cm longa. *Foliolum* laterale summum brevissime decurrens, foliola cetera sessilia, fere ad costam pinnatisecta (pars folioli media indivisa omnino 0.3-0.6 mm lata), segmentis utrinque (2-)3-5(-7),  $\pm$  linearibus, c. 2-4.5  $\times$  0.4-0.7 mm magnis. *Sepala* tota pilis crassis et item tenuibus tecta. *Petala* 7 mm longa. *Stamina*  $\pm$  20; antherae 0.4-0.5 mm longae. *Stylus* 1.4-1.6 mm longus.

*Potentilla sumatrana* var. *achillea* closely resembles *P. papuana* var. *victoralis* by its pinnatisect leaflets, but in other relevant characters it agrees with the typical *P. sumatrana* Soják. This conspicuous taxon evokes the impression of a separate species but in view of the transitions to *P. sumatrana* var. *sumatrana*, the rank of a variety appears much more appropriate.

***Potentilla spectabilis* Businský & Soják, sp. nova**

Holotype: China, E Tibet (Xizang), E below the Serkyimla Pass on Sichuan-Lhasa road about 17 km ENE of Nyingchi (Nyingtri), 29°37'N, 94°39'-41'E, 4300-4450 m, 1992, *Businský 33044* (PR).

A *Potentilla fruticosa* s.l. petalis et antheris insigniter majoribus distat.

*Rami* atrofusci, appresse pilosi, dense foliati. *Folia* omnia 5-nata, brevipetiolata. *Stipulae* connatae, latae, stramineae, parviglandulosae, nervis prominentibus, longe patenter pilosae. *Foliola*  $\pm$  oblongo-elliptica, 0.7-1.2  $\times$  0.3-0.4 mm magna, supra subappresse, densiuscule pilosa, subtus ad costam pilosa, ceterum glabra, nervatura discolori prominentia, mediocriter densa. *Flores* 5 cm in diam., sessiles. *Petala* 25  $\times$  20 mm magna. *Antherae* oblongae, 1.5-1.9 mm longae. *Stylus* 1.3 mm longus.

*Potentilla spectabilis* differs from *P. fruticosa* L. s.l. (including *P. arbuscula* D. Don) only in the size of floral organs. But the difference is very conspicuous. The first author had an opportunity to study *P. spectabilis* in the field. He found that this taxon was abundant and stable in its characters in a rather extensive area (extending over more than 15 km). No transitional forms to other species of the *P. fruticosa* complex or hybrids were observed. Therefore we consider it to be a distinct species.

***Potentilla xaurantiaca* Soják, nothosp. nova**

= *Potentilla gerardiana* Lindl. ex Lehm.  $\times$  *P. nepalensis* Hook.

Holotype: Pakistan, Kashmir, Desu, 1936, *Timins 170* (BM) – Fig. 3 A.

A *Potentilla gerardiana* sicut a *P. nepalensi* foliis digitato-pinnatis et petalis aurantiacis primo obtutu discrepat.

*Caudex* brevis, eramosus. *Caules*  $\pm$  30 cm alti,  $\pm$  recti, bene foliati, superne laxe ramosi. *Folia* radicalia ignota; folia caulina  $\pm$  6, quibus duo infima 3-jugo-digitato-pinnata, media digitata, quinata, suprema ternata; folia infima e foliolis 5 superioribus digitatis vel subdigitatis (foliola 0.5-1.5 mm a sese remota) et jugo foliolorum inferiori 3-11 mm remoto consistentia. *Petiolis* pilis rectis, (1-)1.5-2.5(-3) mm longis, patentibus induti. *Foliola* supra viridia, subtus  $\pm$  viridia, parum submicantia, pilis rectis, longis, rigidulis, subappressis, mediocriter densis vestita; foliolum terminale  $\pm$  cuneato-obovatum,  $\pm$  2  $\times$  1 cm magnum, dentatum, dentibus utrinque  $\pm$  acutis, parvis. *Inflorescentia* laxa,  $\pm$  10-flora. *Flores*  $\pm$  1.5 cm in diam. *Episepala*  $\pm$  elliptica, sepalis breviora. *Petala* in vivo aurantiaca, in sicco sordida, pallide rubroviolaceo-suffusa. *Antherae* rubroviolaceae vel brunnescentes,  $\pm$  0.8-1 mm longae. *Stylus* rubroviolaceus, basi modice intumescens, 1.2-1.3 mm longus, stigmatem non dilatato. *Nuculae* non evolutae.

This is an interesting hybrid of two species that are quite different in their general appearance. *Potentilla xaurantiaca* is easy to identify due to the unusual leaf shape (a combination of palmate and pinnate leaf) and orange petals. It is extremely rare, having been found only once in Kashmir. Nothing is known about its behaviour in natural habitats.



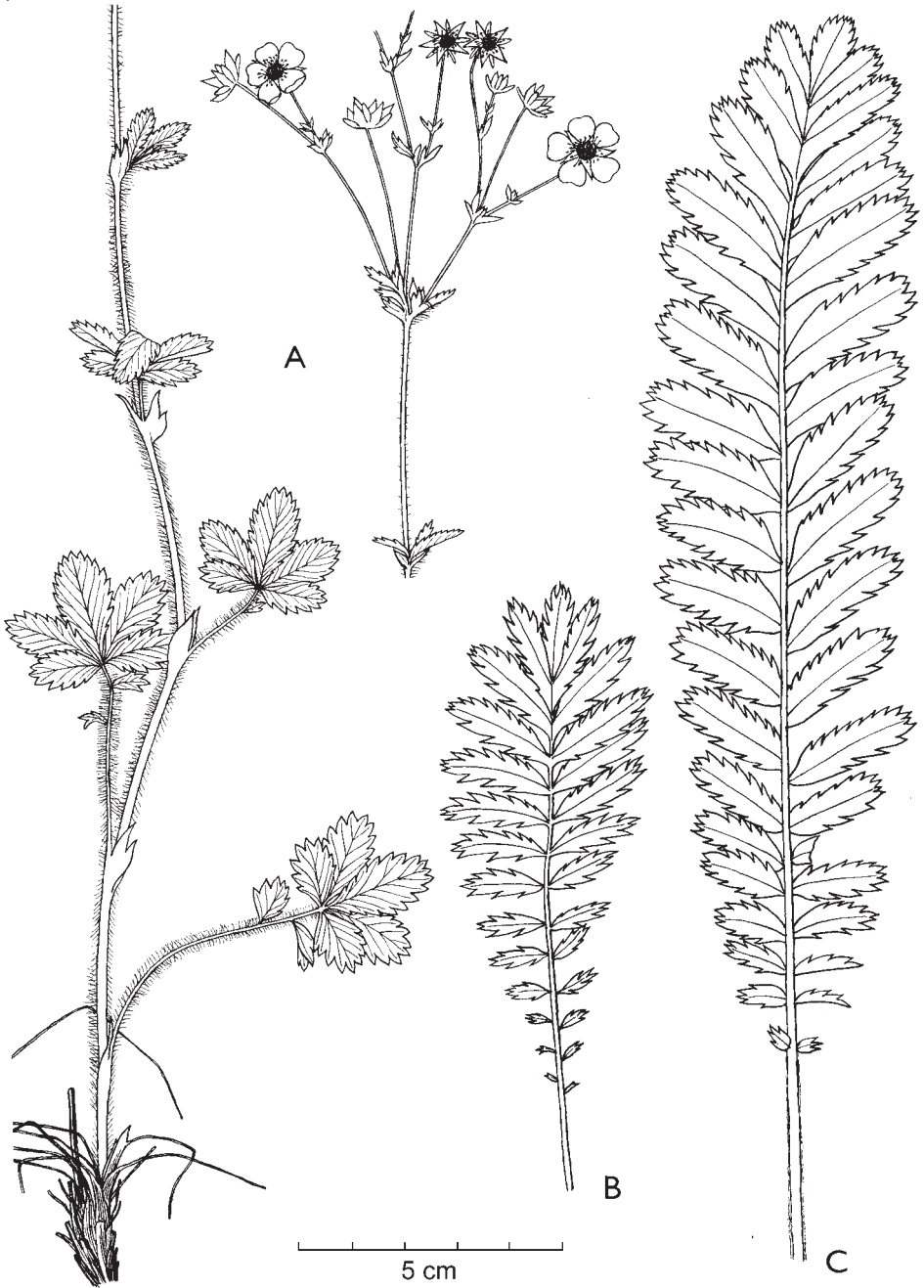


Fig. 3. A: *Potentilla xaurantiaca*, habit; B: *P. peduncularis* var. *peduncularis*, leaf; C: *P. peduncularis* var. *subcontigua*, leaf. – A from Timins 170; B from D. Don 1016; C from Stainton, Sykes & Williams 5980.

***Potentilla peduncularis* var. *subcontigua* Soják, var. nova**

Holotype: Nepal, Lartung (S of Tukucha), Kali Gandaki, 1954, *Stainton, Sykes & Williams 1949* (BM) – Fig. 3C.

A *Potentilla pedunculari* var. *pedunculari* differt foliis multijugis et foliolis subtus glabrescentibus vel sparse pilosis.

*Folia* radicalia 17-25-jugo-pinnata. *Foliola* subtus viridula, in nervis dense pilosa, inter nervos glabra vel sparse pilosa. Notis ceteris, e.g. stipulis longe albo-lanatis, auriculis eis connatis etc. cum varietate typica congruit.

*Additional specimens examined.* – NEPAL: S of Jumla, 1952, *Polunin, Sykes & Williams 4800* (BM); above Sauwala khola, 1954, *Stainton, Sykes & Williams 4390* (BM); Lamjung Himal, 1954, *Stainton, Sykes & Williams 4360* (BM); *ibid.*, Rambrong, 1954, *Stainton, Sykes & Williams 5980* (BM); Annapurna Himal, Yati khola, 1954, *Stainton, Sykes & Williams 6570* (BM); Satsae khola, 1970, *Dobremez 593* (BM); Lamrak, 1929, *Dhwoj 199* (BM); Lari, 1974, *Yon 176* (BM).

The typical *Potentilla peduncularis* D. Don has 9-16 pairs of leaflets silvery white beneath. *P. peduncularis* var. *subcontigua* corresponds with it in most characters but has 17-25 pairs of leaflets, which are greenish beneath and glabrous or sparsely hairy between the veins. By its indumentum of leaflets it resembles *P. contigua* Soják but stipular auricles of the last species are not coalesced and the stipules long-woolly.

***Potentilla hubsugulica* Soják, sp. nova**

Holotype: Mongolia borealis, in regione alpina et subalpina montium ad ripam occidentalem lacus Chubsugul (Hubsugul, Chövsgöl), 15-20 km septentr. a vico Chadchal, 2000-2800 m, 1965, *Deyl & Soják* (PR; isotypes: B, BM, E, K, LE).

A *Potentilla evestita* petiolis, foliolis et calycibus eglandulosis et stylis basi non intumescensibus faciliter dignoscitur. A *P. grisea* inflorescentia laxa, petalis plane apertis atque foliis basalibus distichis diversa.

*Caules* 20-26 cm alti, ascendentes, 1-2-phylli. *Folia* basalia ternata, disticha. *Petioli* pilis crispatis, brevioribus, tenuibus, rarius praeterea pilis rectiusculis vel flexuosis, crassiusculis, 1-1.5 mm longis admixtis, eglandulosi. *Foliola* omnia subtus aequaliter vestita, cano-viridula, inter nervos pilis crispatis vel curvato-flexuosis numerosis, tomento laxo efficientibus vestita (superficies folioli sub tomento bene visibilis), eglandulosa. *Inflorescentia* conspicue laxa. *Sepala* pilosa, eglandulosa. *Petala* late patentia. *Stylus* ± 1.3 mm longus, basi non incrassatus, in contrario ± attenuatus. *Nuculae* ± 1.4 mm longae.

*Potentilla hubsugulica* has eglandulose petioles, leaflets and sepals and styles not thickened at base. The very similar *P. evestita* Th. Wolf (including *P. regelii* Th. Wolf) has glandulose petioles, leaflets and sepals and styles thickened at base. *P. hubsugulica* is undoubtedly derived from hybrids of *P. crebridens* Juz. × *P. gelida* C. A. Mey. *P. evestita*, also a hybrid species, has been derived from another parent combination (probably *P. desertorum* Bunge × *P. nervosa* Juz. vel *P. crebridens* Juz.).

***Potentilla xala-arczae* Soják, nothosp. nova**

= *Potentilla hololeuca* Boiss. ex Lehm. × *P. multifida* L.

Holotype: Kyrgyzstan, Tian-Schan, montes Kirgizskij Chrebet, locis graminosis in valle rivuli Ala-arča ad meridiem versus ab oppido Frunze (nunc Bishkek), 1500-2000 m, 1979, *Soják* (PR; isotypes: B, LE) – Fig. 4 B-G.

A *Potentilla xbishkekensi*, cui habitu similis est, sepalis eglandulosis, foliolis subtus dense tomentosus pilis crispatis, subappressis (superficies folioli non visibilis) et inflorescentia laxa differt. A *P. multifida* praesertim petalis multo longioribus clare distat.

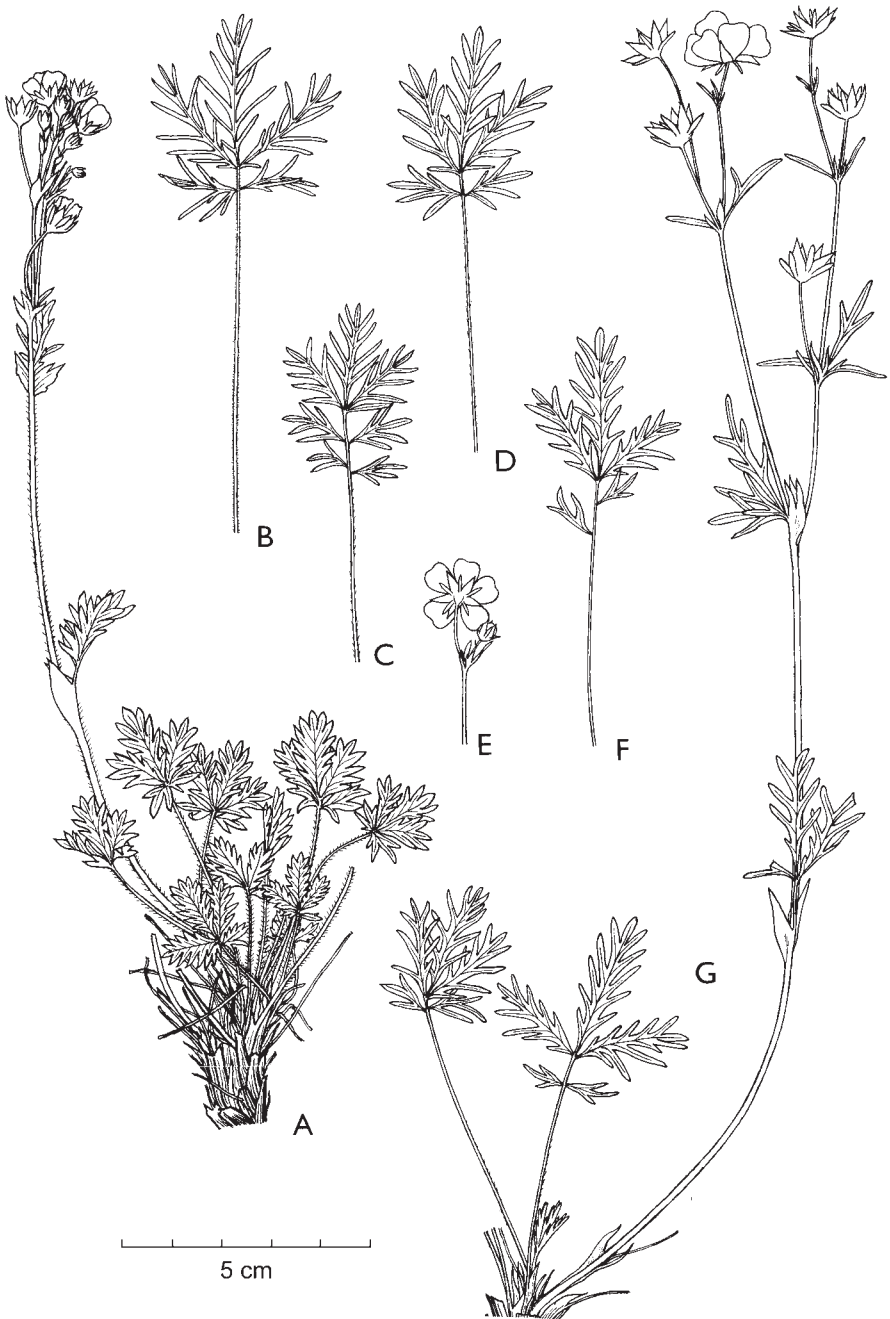


Fig. 4. A: *Potentilla xtundricola*, habit; B-G: *P. xala-arcaezae*, leaves (B-D, F), flower (E), habit (G). – From the type collections.

*Caules* ascendentes, 18-30 cm alti; folia caulina 1-3. *Folia* basalia 2-3-jugo-pinnata. *Petioles* pilis rectis, 0.5-1 mm longis, appressis vel arrecte subpatentibus, rarius pilis longis et item brevioribus flexuosis vel subcrispatis vestiti. *Foliola* supra pilosa, subtus albida, opaca, ad nervos pilis appressis, non longis, ceterum pilis crispatis, densiusculis tomentosa, eglandulosa; foliolium terminale segmentis utrinque 4-5, segmenta profunde ( $\pm$  ad 4/5) usque ad costam attingentia (pars folioli media indivisa 0.6-2.2 mm lata), linearia, a sese remota. *Inflorescentia* laxa, 4-10-flora. *Flores* 1.6-1.9 cm in diam. *Sepala* pilis longis et brevibus modice numerosis tecta, eglandulosa. *Petala*  $\pm$  6.5-8 mm longa, sepalis multo longiora. *Antherae*  $\pm$  0.5-0.8 mm longae. *Stylus* basi parum sed distincte intumescens, 0.9-1.2 mm longus. *Nuculae* non evolutae.

Rare individuals of *Potentilla xala-arczae* are found scattered in populations of *P. multifida* L. They are conspicuous by their large petals, but approach in other characters *P. multifida*. They are sterile and therefore seldom in nature. They are, however, of considerable theoretical importance because they demonstrate the way *P. multifida* behaves in crossing with morphologically remote species.

In interspecific hybridization, the majority of characters of *P. multifida* are dominant. Thus hybrids of *P. multifida* have the same or very similar leaflet shape (determining, to a certain extent, their habit) and indumentum of petioles as the parent species. The size of petals is not dominant and hybrids with all large flowered species have petals distinctly longer than in *P. multifida*. *P. xala-arczae* also indicates the way how some present species of *P. multifida* aggregate could have arisen.

The majority of specimens of *P. xala-arczae* so far found have petioles with only short, straight, appressed hairs; only two plants have, in addition, also crispate hairs which are characteristic of *P. hololeuca*.

***Potentilla xbishkekensis* Soják, nothosp. nova**

= *Potentilla agrimonioides* M. Bieb.  $\times$  *P. multifida* L.

Holotype: Kyrgyzstan, Tian-Schan, montes Kirgizskij Chrebet, in valle rivuli Ala-arča ad meridiem versus ab oppido Frunze (nunc Bishkek), 1500-2000 m, 1981, Soják (PR; isotypes: B, LE) – Fig. 5 A-B.

A *Potentilla xala-arczae*, cui habitu similis est, sepalis glandulosis (glandulae numerosae, bene visibiles), foliolis subtus subtomentosis, pilis curvatis vel flexuosis patentibus vestitis (superficies folioli sub lente  $\pm$  visibilis) et inflorescentia subcontracta sufficienter distinguenda. A *P. multifida* praesertim petalis longioribus et sepalis glandulosis facile dignoscitur.

*Caules* ascendentes, 20-40 cm alti; folia caulina  $\pm$  3. *Folia* basalia 3-jugo-pinnata. *Petioles* pilis rectis, appressis vel arrecte subpatentibus, 0.5-1 mm longis et praeterea plerumque glandulis parvis subsessilibus (interdum insuper pilis brevibus patentibus,  $\pm$  rectiusculis, modice numerosis) induti. *Foliola* supra pilosa, subtus cana, opaca, laxe tomentosa, pilis curvato-flexuosis (superficies folioli sub lente  $\pm$  visibilis) et glandulis minimis (male visibilibus) subsessilibus, modice numerosis tecta; foliolium terminale segmentis utrinque 5-6, segmenta saepe fere ad costam attingentia (pars folioli media indivisa 1-2 mm lata), oblonga, modice remota vel subapproximata. *Inflorescentia* subcontracta, 3-10-flora. *Sepala* pilis longis sparsis et item brevibus densis et insuper glandulis numerosis, luteolis, non magnis sed bene visibilibus oblecta. *Petala*  $\pm$  6 mm longa, sepalis (1-2 mm) longiora. *Antherae* 0.5-0.7 mm longae. *Stylus*  $\pm$  1 mm longus, basi distincte incrassatus. *Nuculae* non evolutae.

Similarly as *Potentilla xala-arczae* this hybrid was found scattered in a population of *P. multifida* L., where it attracted attention due to its large petals while its leaf and leaflet shape fell within the variation range of *P. multifida*.

*Potentilla xbishkekensis* differs from *P. multifida* and the hybrid *P. hololeuca*  $\times$  *P. multifida* in its sparse indumentum of the underside of the leaflets (a transition between the true and false tomentum) beneath which small glands can be often seen, more contracted inflorescences and es-

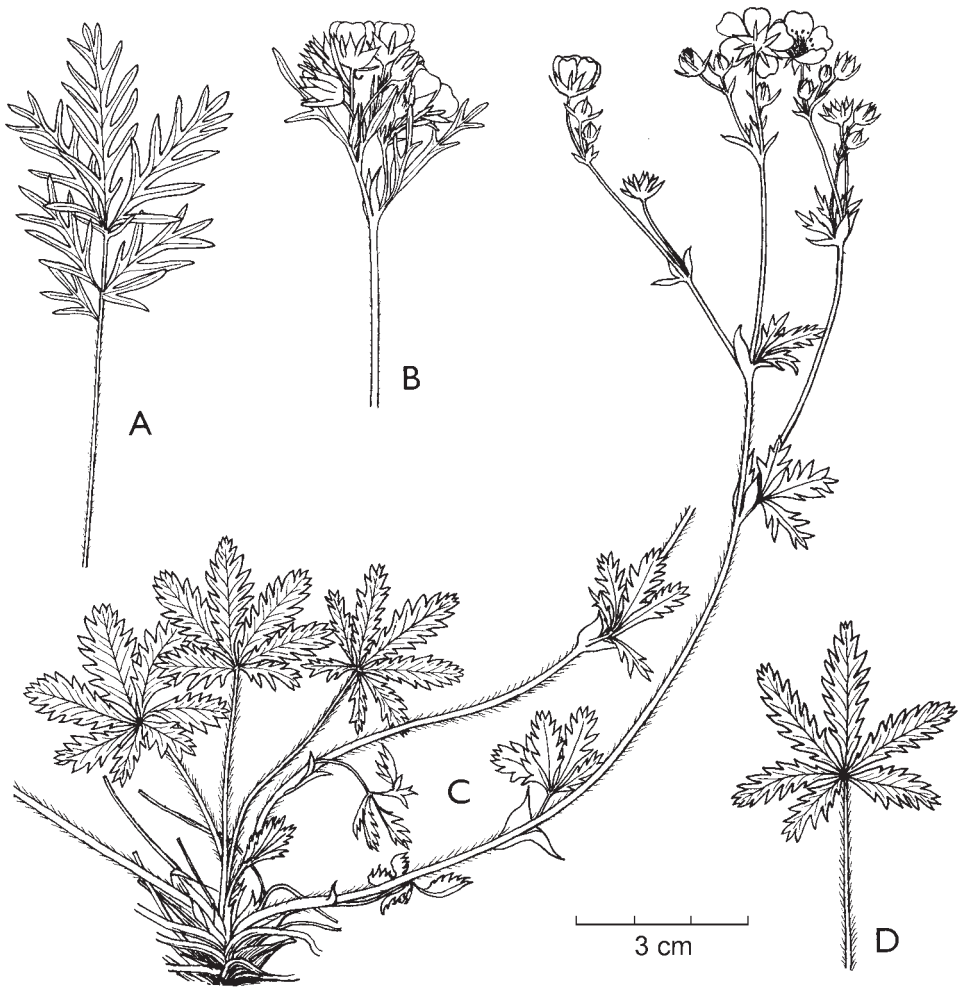


Fig. 5. A-B: *Potentilla* *xbishkekensis*, leaf (A), inflorescence (B); C-D: *P.* *xsolitaria*, habit (C), leaf (D). – From the type collections.

pecially in the possession of numerous, large, yellowish glands on the sepals. These are some of the few characters obtained from *P. agrimonioides* M. Bieb. indicating the participation of this species in the origin of a hybrid that is, in other characters, close to *P. multifida*.

*P. xbishkekensis* is a rare hybrid of systematically remote species differing much in their habit. The characters of *P. agrimonioides* are suppressed whereas those of *P. multifida* strongly prevail. If this plant had been found in the field without the parent species being present, its hybrid origin would have hardly been suspected and it would have been considered to be a new species of the *P. multifida* aggregate.

***Potentilla xsolitaria* Soják, nothosp. nova**

= *Potentilla asiatica* (Th. Wolf) Juz.  $\times$  *P. fedtschenkoana* Siegf. ex Th. Wolf

Holotype: Uzbekistan, Tian-Schan occid., in declivi graminoso montis Bolšoj Čimgan bor.-orient. ab oppido Taškent, 2500 m, 1981, Soják (PR; isotypes: B, BM, E, K, LE) – Fig. 5C-D.

A *Potentilla fedtschenkoana* praesertim pilis petiolorum subappressis, foliolis subtus etomentosis (pilis flexuoso-crispatis absentibus), dentibus foliolorum brevioribus, a *P. asiatica* foliolis angustis, profundius dentatis, subtus inter nervos pilis patentibus, mollibus, curvatis vel subflexuosis clare differt. *P. algida*, quae similis, a hybrida nostra foliolis latis et petalis longioribus (7-11 mm), interdum item petiolis pilis rectis et brevioribus flexuoso-subcrispatis obtectis recedit. *P. macropoda* praesertim pilis petiolorum patentibus bene discrepat.

*Caudex* congeste pluriceps, crassus. *Caules* laterales, arcuato-ascendentes, 10-20 cm alti, a 1/3-2/3 ramosi; folia caulina 1-2. *Folia* basalia digitata, 5-7-nata. *Petioli* pilis rectiusculis, oblique arrectis vel subappressis, 1-2 mm longis tecti (interdum glandulis subsessilibus, minutis, interdum pilis brevibus  $\pm$  patentibus, curvatis vel rectiusculis,  $\pm$  sparsis immixtis). *Foliola* supra viridia, pilosa, subtus cana, ad nervos pilis rectis,  $\pm$  appressis, inter nervos pilis brevibus, patentibus, curvatis vel subflexuosis (interdum modice arcuatis et rectiusculis immixtis) modice densiusculis vestita (superficies folioli sub indumento bene visibilis); foliolum medium oblongum vel anguste cuneato-ellipticum, dentibus utrinque 7-9, ad 1/3-2/3 dimid. laminae attingentibus. *Inflorescentia* laxa, 5-15-flora. *Pedicelli* tenues, longiusculi. *Flores* 1.5-1.8 cm in diam. *Calyx* pilis longis,  $\pm$  subappressis tectus. *Episepala*  $\pm$  oblonga, sepalis breviora. *Petala* lutea, 6-7.7 mm longa, sepalis multo longiora. *Antherae* 0.7-1 mm longae. *Stylus* 0.7-1 mm longus, basi intumescens et papillosus. *Nuculae* non evolutae.

A rare hybrid, of which only one specimen has been found between the parents. Similarly as all the other sterile intersectional hybrids, it is only of theoretical importance. By its conspicuously narrow leaflets with a large number of narrow, deeply incised teeth and tough hairs on the petioles, it occupies a special position among the products of hybridization between *Potentilla* sect. *Terminales* (Döll) Gren. & Godr. [= *P.* sect. *Argenteae* (Th. Wolf) Juz.] and *P.* sect. *Chrysanthae* (Th. Wolf) Juz. The influence of *P. fedtschenkoana* can be seen in these characters. In the origin of other taxa derived from the cross of members of *P.* sect. *Terminales* and *P.* sect. *Chrysanthae*, *P. argentea* L., not *P. fedtschenkoana*, participated. The presence of *P. asiatica* (Th. Wolf) Juz. is indicated by the subappressed hairs on the petioles.

*P. macropoda* Soják and *P. xleteae* Prodan (*P. argentea* L.  $\times$  *P. thuringiaca* Bernh.) are similar but have broad, shallowly toothed leaflets and patently hairy petioles. *P. turgaica* Soják, which does not occur in the distribution area of *P. xsolitaria*, has finely hairy petioles, resembling those of *P. argentea*, or is glabrescent. The hybrid species *P. algida* Soják, which comes very close to our hybrid by its habit and its indumentum of the leaflets, shares only one parent, *P. asiatica*, whereas the other is apparently *P. hololeuca* Boiss., which is indicated by the large petals and the sometimes subpinnate leaves or flexuose-subcrispate hairs on the petioles.

***Potentilla xrecensita* Soják, nothosp. nova**

= *Potentilla chinensis* Ser.  $\times$  *P. tergemina* Soják

Holotype: Obtained by experimental crossing of *P. chinensis* (originating from Beijing, China) with *P. tergemina* (from Ulaanbaatar, Mongolia) in a garden near Prague, 1972, Soják (PR); isotypes: B, BM, E, LE, K, MHA, MW, TK).

Inter parentes media vel saepius *Potentillae tergeminae* similis. A parentibus ambis difficiliter distinctiva, sed sterilis. A *P. tergemina* foliolis et eorum segmentis magis numerosis sicut inflorescentia multiflora distat. A *P. chinensi* indumento petiolorum brevioris et foliolis item segmentis minus numerosis differt.

*Folia* basalia 4(-5)-jugo-pinnata. *Petioli* pilis patentibus (1-)1.5-2(-2.5) mm longis tecti. *Foliola* in sicco  $\pm$  subcoriacea, supra viridia, subtus albida, pilis crispatis densiuscule tomentosa; foliolum terminale ambitu  $\pm$  late  $\pm$  oblongum, segmentis utrinque 6-7(-8) profunde, saepe fere ad costam pinnatisectum; segmenta linearia vel oblonga. *Inflorescentia* saepe valde ramosa, 25-200-flora. *Flores*  $\pm$  1.3 cm in diam. *Episepala* angusta, sepalis breviora. *Petala* 4-4.5(-5) mm longa, sepala insigniter superantia. *Antherae* 0.4-0.6 mm longae. *Stylus* 0.9-1 mm longus, basi parum intumescens. *Nuculae* non evolutae.

*Specimens examined.* – RUSSIA: Amurland, Blagowechtschensk, 1904, *Karo* (DR); Amur. obl., Zejskij r-n, Novo-Vysokoe, *Šemsiva* 47 (PR); Vladivostok, 1973, *Čvtaeva* (VLA). — MONGOLIA: Vostoč. ajm., Chalchin gol som., Numuyk, 1949, *Junatov* 10627 (LE).

Even though both parent species of *Potentilla*  $\times$ *recensita* are clearly different at first sight, their hybrid is difficult to identify. To test the supposed hybrids collected in the wild, experimental crossing, were undertaken. The hybrid obtained is morphologically identical with the natural one. The hybrid differs from *P. tergemina* Soják in having more numerous subcoriaceous leaflets and segments and a rich inflorescence. From *P. chinensis* Ser. it differs especially in the shorter indumentum of the petioles and less numerous leaflets and their segments. This rare sterile hybrid has been collected in two localities in the Amur catchment area and it also occurs in the vicinity of Vladivostok and along the Mongolian-Chinese border.

*P. tergemina* has 3(-4) pairs of leaflets, each leaflet with 4-6 pairs of segments. *P.  $\times$ recensita* has 4(-5) pairs of leaflets, each with 6-7 pairs of segments. *P. chinensis* has 8-10(-12) pairs of leaflets, each with 6-11 pairs of segments. *P. chinensis* has distinctly longer hairs on the petioles (2-3 mm long) but this character is not seen in the hybrids.

***Potentilla grisea* var. *ripicola* Soják, var. nova**

Holotype: Kyrgyzstan, Tian-Schan, montes Kirgizskij Chrebet, locis graminosis supra vallem rivuli Ala-arča (ad meridiem versus ab oppido Frunze = Bishkek), 1979, *Soják* (PR; isotypes: B, BM, E, K, LE).

A *Potentilla grisea* var. *grisea* foliis omnibus (i. e. item internis) subtus viridibus, etomentosis (pilis flexuoso-crispatis deficientibus) bene differt. Habitu *P. doubjonneanae* (et *P. turczaninowianae*) admonens, a qua pilis petiolorum brevioribus flexuosis vel crispatis et petalis erectis distat.

*Folia* basalia ternata, polysticha. *Petioli* pilis oblique patentibus, rectiusculis vel curvato-flexuosis, rigidulis, 0.5-1.8 mm longis et praeterea brevioribus flexuosis usque crispatis, mollissimis induti. *Foliola* supra appresse, modice dense pilosa vel glabrescentia, subtus omnia viridia, pilis rectiusculis vel curvatis (ad nervos, saepe item inter nervos collocatis), appressis, rarius patentibus, tomentum non efficientibus tecti (pili crispati nulli). *Inflorescentia* contracta. *Petala* 6-7 mm longa, plus minusve erecta.

In typical *Potentilla grisea* Juz. all or only internal leaves are tomentose beneath with crispate hairs. The new variety described here from the central Tien Shan (from where the species has so far not been reported) has all leaflets green, non-tomentose, without crispate hairs beneath. It occurs in a number of homogenous populations. It resembles *P. doubjonneana* Cambess. (or *P. turczaninowiana* Stschegl.) by its habit and indumentum but in other characters, especially the presence of flexuose-crispate hairs on the petioles, congested inflorescence and erect petals, it agrees with *P. grisea* var. *grisea*.

I consider this interesting plant as a variety of *P. grisea* because I found in the same valley several micropopulations of *P. grisea* var. *grisea* with leaves tomentose beneath.

***Potentilla*  $\times$ *tundricola* Soják, nothosp. nova**

= *Potentilla hyparctica* Malte  $\times$  *P. litoralis* Rydb.

Holotype: Canada, East Coast of Hudson Bay, Sucker Creek, sandy and silted stream outlet, dry tundra, 1941, *Baldwin, Hustich, Kucyniak & Tuomikoski* 781 (H) – Fig. 4 A.

A *Potentilla crantzii*, cui habitu similis, praesertim foliis saltem nonnullis subpinnatis, polystichis, valde glandulosis et hypanthiis nonnullis infundibuliformibus differt. A *P. hyparctica* foliis quinatis et a *P. litorali* foliis subdigitatis et foliolis minus profunde divisis inter alia recedit.

*Caudex* ramosus. *Caules*  $\pm$  15 cm alti, unifoliati, pilis longiusculis, rectiusculis,  $\pm$  erecto-patentibus et item brevioribus, flexuosis, numerosis et insuper glandulis parvis induti. *Folia* basalia

polysticha, quinata, subpinnata (usque fere digitata), i.e. foliolis externis 0.2-1 mm ab internis remotis. *Petioli* pilis rectis, 0.5-1.2 mm longis (interdum etiam brevioribus flexuosis) et glandulis subsessilibus vestiti. *Foliola* supra pilosa, subtus viridia, pilis longis,  $\pm$  subpatentibus, mediocriter densiusculis et saepe etiam brevioribus, mollibus, curvatis et praeterea glandulis sordide citrinis numerosis oblecta; foliolium terminale 0.6-1  $\times$  1.2-2.2 cm magnum, segmentis utrinque  $\pm$  4, ad 3/5-3/4 divisum. *Inflorescentia*  $\pm$  6-flora. *Hypanthium* in floribus nonnullis late infundibuliforme. *Calyx* pilis rectis, longis et glandulis numerosis tectus. *Episepala* sepalis breviora. *Petala* 5 mm longa, sepalis longiora. *Antherae* 0.4-0.5 mm longae. *Stylus* 1.1 mm longus, basi non intumescens. *Nuculae* ignotae.

*Potentilla  $\times$ tundricola* is morphologically intermediate between its parents *P. hyparctica* Malte and *P. litoralis* Rydb. The participation of *P. litoralis* is indicated, i.a., by the broadly funnel-shaped hypanthia of some flowers, whereas the participation of *P. hyparctica* is indicated by the short styles not thickened at the base. The offspring of interspecific hybrids of *P. hyparctica* resembles *P. crantzii* (Crantz) Beck ex Fritsch but if *P. crantzii* had participated in the origin of our plant, it would not have such short styles.

*P.  $\times$ tundricola* resembles *P. crantzii* but is easy to recognize: its basal leaves are polystichous, some leaves are subpinnate with leaflets covered with curvate, fine hairs between the veins beneath, some hypanthia are funnel-shaped at the base, and the petals, styles and anthers are shorter. In addition, *P.  $\times$ tundricola* is all covered with numerous glandules.

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